Cruise: Western Time Series Boundary (WBTS)
Ship: R/V Ronald Brown
Dates: February 15th – March 5th, 2012
Expocode: 33RO20120215
Chief Scientist: Molly Baringer
Equipment: CTD samples collected
Total number of stations: 4

Sample Collection

The discrete samples were collected by Kyle Seaton, Andrew Stefanick and James Hooper from Niskin bottles attached to a 24 bottle configured rosette. The date and time listed in the data file are UTC when each sample bottle was collected.

DIC:
4 locations, 40 samples each 500-ml, 6 sets of duplicate samples
Sample_ID#: 21 - 80
PI: Dr. Rik Wanninkhof
Analyzed by: Charles Featherstone

TAlk:
4 locations, 40 samples each 500-ml, 6 sets of duplicate samples
Sample_ID#: 21 - 80
PI: Dr. Rik Wanninkhof
Analyzed by: Dr. Leticia Barbero

Sample Analysis

DIC:
Analysis date: March 9, 12 and 13, 2012
Coulometer used: AOML 4
Blanks: 30.0, 30.0 and 26.1 counts/min
CRM # used and assigned value (include both DIC and salinity): Batch 112, c: 2011.1 µmol/kg, S: 33.305
CRM value measured: AOML 4: offset 0.6 µmol/kg (2011.7 µmol/kg), offset 1.7 µmol/kg (2012.8 µmol/kg) and offset 0.8 µmol/kg (2010.3 µmol/kg).
Average run time, minimum run time, maximum run time: 10, 18 and 9 min; 9, 12 and 8 min; 13, 20 and 12 min
Reproducibility: (# samples and average difference): 6 sets of duplicate samples, average difference 0.92 µmol/kg
CRM, salinity and HgCl2 correction applied: Salinity correction was applied using TSG salinity
Remarks-
The volume correction was applied due to added HgCl2 (Measured DIC*1.00037).

The first CRM of each cell was used for a CRM correction.

TAlk:
The results posted are duplicate analyses from the same sample bottles used for DIC.
Analysis date: 08/06/2013 – 09/06/2013
Titration system used: Open cell
CRM batch: 108, S = 33.224, certified TA = 2218.00 µmol/kg
CRM batch: 112, S = 33.305, certified TA = 2223.26 µmol/kg

1-2 CRM samples were run daily on each cell, before and after the seawater samples. The TA for the water samples was corrected using the daily averaged ratios between the certified and measured values of the 2 CRMs run on each cell. The following table shows the CRM measurements for each day and cell.

Cell System (CRM batch)	Date	Time	Bottle #	TA (cert. TA)	|ΔCRM|
1(108)	8/6/2013	11:38:28	770	2209.79 (2218.00)	
1(108)	8/6/2013	18:23:53	1082	2206.76 (2218.00)	3.03
1(108)	8/29/2013	18:23:53	695	2211.85 (2218.00)	
1(108)	9/6/2013	09:36:25	906	2213.45 (2218.00)	
1(112)	9/6/2013	19:19:14	109	2217.82 (2223.26)	
2(108)	8/29/2013	12:20:04	695	2216.88 (2218.00)	
2(108)	9/6/2013	09:33:38	906	2217.4 (2218.00)	
2(112)	9/6/2013	19:11:37	109	2221.9 (2223.26)	

Reproducibility: 6 sets of duplicate samples were run, with an average absolute difference of 2.90 µmol/kg (0.17-10.81), and a Standard Deviation of 4.35.

Bottle #	System	Date	Time	S	TA	|Difference|	Comments
23	1	8/6/2013	17:12:28	34.893	2321.78		
24	1	8/6/2013	17:45:26	34.893	2322.19	0.41	
63	2	9/6/2013	15:44:30	36.695	2401.48		

64	1	9/6/2013	15:43:18	36.695	2401.31	0.17
66	1	9/6/2013	16:20:42	35.057	2317.61	
67	2	9/6/2013	16:43:41	35.057	2317.03	0.58
71	2	9/6/2013	17:44:15	35.351	2327.44	
72	1	9/6/2013	17:40:53	35.351	2316.63	10.81
76	1	9/6/2013	18:43:46	35.957	2366.96	
77	2	9/6/2013	19:13:20	35.957	2361.71	5.25
78	1	9/6/2013	19:12:50	36.312	2378.68	
79	2	9/6/2013	19:44:10	36.312	2378.87	0.19
					Average	2.90
					Std. Dev.	4.35

Remarks

The two systems behaved well during the analyses. On August 29th, a short number of samples were run (only one on system 1) and only one CRM was run.
There was a problem with the pHmeter communication with the computer controlling the titration for sample 28. The titration was interrupted and had to be finished manually. The sample has been flagged 3.

Comments

The latitude, longitude and salinity reported with the DIC and TAlk measurements were taken from the Niskin bottle field log. The field log values are provided for reference; no post-cruise assurance of accuracy has been done to this data.

The Sample_ID is the sample bottle number for the discrete samples.

The DIC instrument was stable: the gas loop and CRM values did not change significantly through out the life span of each cell. Also both cells from separate days gave calibration values of similar magnitude.

UPDATE:
Between March and June of 2021, all of the data for the discrete samples was put into a uniform format. The supporting information was checked for accuracy, especially the expocode, date, time, and positions.